Log 289-a

SECRET

Copy No. a of a-4

No. of Pages 4

25X1

[redacted]

ACTIVITY SUMMARY

To: John C.

25X1 From: [redacted]

Subject: Activity Summary
Facility Visit on Contract [redacted] 25X1

25X1 Reference: [redacted] 2201201-AS-35

Date of Visit: March 31 to April 2, 1971

On March 31 to April 2, 1971, [redacted] 25X1
visited the customer facility under Contract [redacted] Three 25X1
prime objectives for this trip were:

1) Discussion with Major Hayden P. regarding Final Report and Handbook.
2) Generation of a six month plan for optical image manipulation at the customer facility.
3) Organization of operational OIM results for the final report.

Discussion concerning the final report and handbook were held on the afternoon of 31 March. Because a complete Handbook for operation of OIM technology would require steps to be taken in the coming year, the present Handbook status will be included as appendices to the Final Report, and used for generation of the final Handbook during the coming year.

SECRET

A six month plan was generated for OIM activity at the customer facility. A draft copy is attached to this activity summary. We will write detailed directives for individual steps as we become involved in them, as performed for the phase plate fabrication effort.

All OIM results were reviewed and documented for the presentation in the final report. Two other images were processed on 2 April to take advantage of their possible inclusion in the list of results.

During the coming week we will concentrate on writing the final report. Continuing effort is being applied to generating phase plates. The edge target was delivered to [redacted] for edge trace analysis. The next program trip will be scheduled for the week of 12 April 1971.

[redacted]

SECRET

To John C.

25X1 From [redacted]

Subject 6 month OIM Lab Plan

Date 2 April 1971

The following program plan for OIM activity describes the laboratory activity for implementing, evaluating and applying optical image processing in the three areas:

1) Amplitude OIM

2) In-line Coherent OIM

3) Holographic OIM.

The first area has been applied during the past six months and will continue at approximately 20% level of effort. The second area, in-line optical processing, is being initiated at the laboratory and will advance to approximately 50% level

SECRET

SECRET

of effort. The third area, holographic OIM was first the subject of the laboratory effort for initial emphasis between April - July, 1970. This area will be re-activated for evaluation with the in-line coherent optical process and for determination of best methods relative to OIM objectives. This area will require approximately 30% level of effort.

Emphasis will be placed on the application of these OIM methods to the extraction of information from imagery, from very low contrast imagery to aberrated imagery. Evaluation and comparisons will be based primarily on results obtained from test and operational imagery.

This program plan should be reviewed, updated and extended in three months.

SECRET

2 April 1971

A. AMPLITUDE OIM

1) Complete the system characterization measurements with edge trace analysis, compare results with sinusoidal target and bar target measure, and evaluate.

2) Write internal report summarizing all results, methods, equipment studies, etc.

3) Continue selection and processing of candidate imagery for contrast - high frequency enhancement, to put together a log of filtering operations.

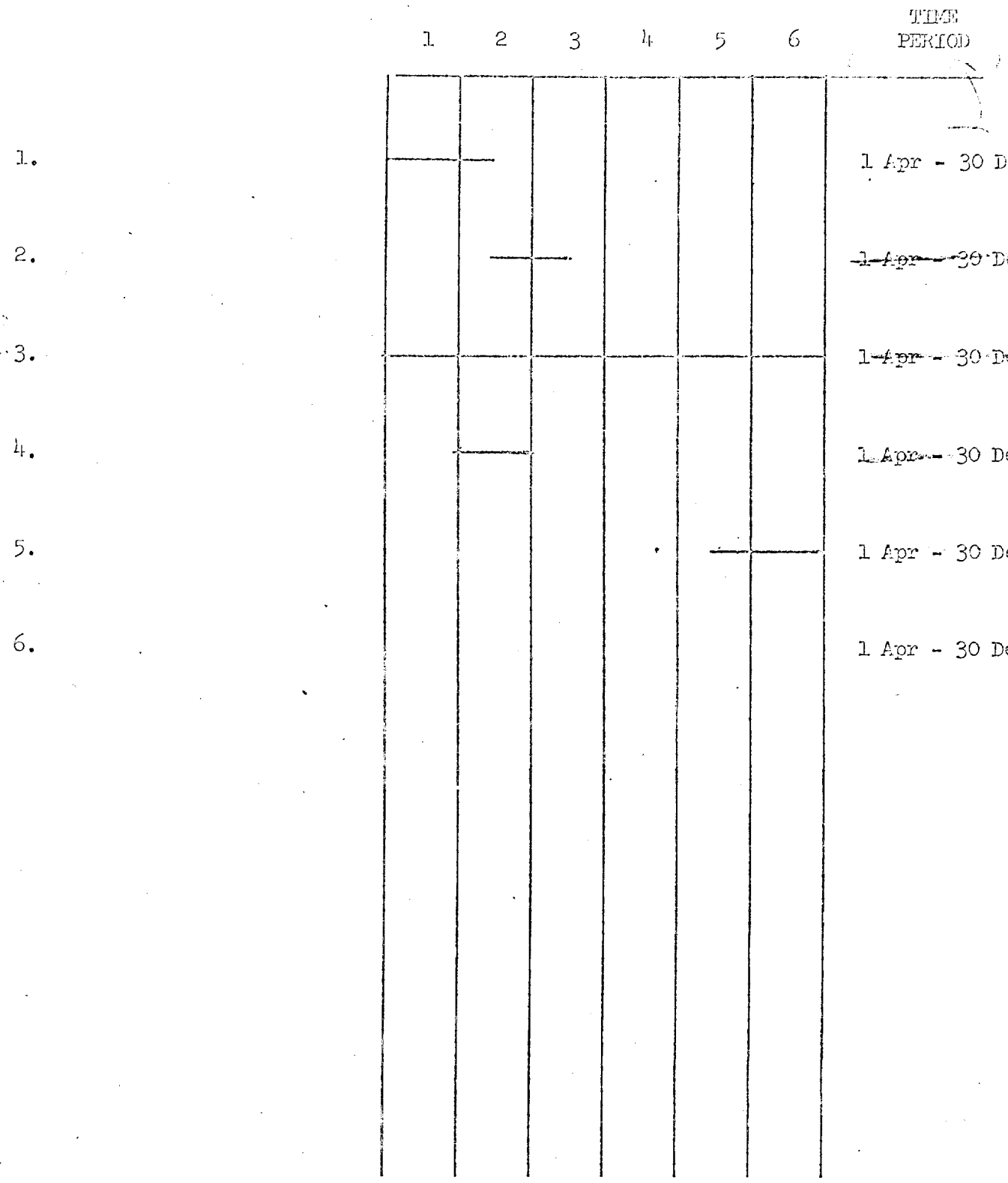
4) Review system configuration and components for macro-optical OIM system.

5) Apply micro-optical interactive viewer to generate OIM results with operational imagery, and input to log of filtering operations.

6) Prepare and publish handbook.

SCHEDULE

MONTHS



B. IN-LINE COHERENT OIM ACTIVITY

1) Build-up of methodology and expertise for fabrication of

a) in-line phase filters

b) amplitude component of in-line filter.

2) Specify design for complex in-line filters (re. defocus and linear blur at operational scales).

3) Fabricate amplitude and phase component of the complex in-line filters for

a) defocus correction

b) linear blur correction.

4) Generate laboratory test imagery on operationally relevant materials for initial testing of system. (Note that these images can be used for demonstration purposes and prepared for such objectives).

5) Set-up coherent in-line optical system components.

a) Basic set-up

b) Preliminary test of process with a resolution target

c) Test of response when source diameter is increased.

Determine best diameter for least noise case and for best reconstruction.

6) Search operational imagery for cases of defocused and linearly blurred images that will be subject to this process. (Note that these should have been sampled to derive specs for filter design).

7) Apply in-line complex filters to laboratory prepared imagery. Test and evaluate.

8) Review system set-up and refine as necessary (including components and filters).

9) Apply in-line coherent OEM to operational targets to test and evaluate system capability.

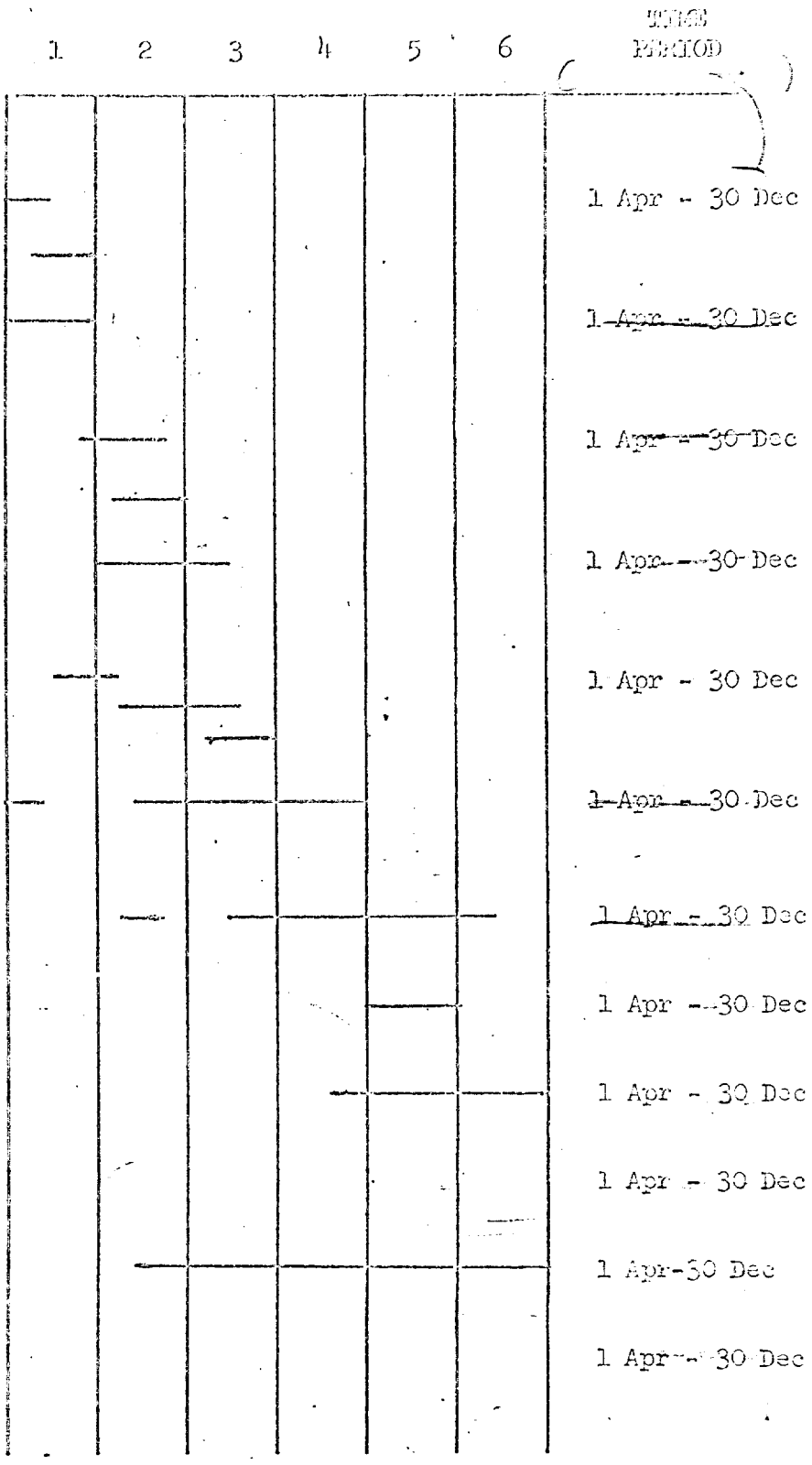
10) Compare results with holographically processed images.

11) Put together results for demonstration as best fits requirements.

12) Recommendations and Conclusions.

SCHEDULE

MONTHS



C. HOLOGRAPHIC OTM

1) Review status of holographic processing as of June 30, 1970. Utilize available capability and expertise for continuing work.

2) Design filter requirements for correction of

a) defocused imagery

b) linearly blurred imagery

as per specs from in-line filters.

3) Set-up holographic filter generating system (Modified interferometer) and determine requirements for system components and for filter materials. Test interferometer and film processing.

4) Fabricate holographic filters for

a) defocus correction

b) linear blur correction.

5) Generate laboratory test imagery on operationally relevant materials for testing of system and for demonstration of process. Use, as much as possible, imagery from in-line case.

6) Set-up holographic processor on T/O bench, using developments as of 30 July 1970 work.

7) Apply holographic filters to laboratory prepared imagery for

a) defocus correction

b) linear blur correction

Test and evaluate.

8) Review system set-up, holographic filter generation and processes. Refine as necessary.

9) Apply to operational imagery and evaluate system capability for image correction.

10) Compare results with in-line processed images.

11) Put results together for demonstration and reporting.

12) Recommendations and Conclusions.

SCHEDULE

MONTHS